

Claims

3-16-00

1. Macromolecular photocrosslinkers having a general formula

5 (A)_n(B)_m(C)_p, wherein

- (i) A, B and C are units of substituted ethylene or siloxane groups in the macromolecular structure;
- (ii) C carries a photoactive groups;
- 10 (iii) n = 0-98 mole %, m = 0-98 mole %, n+m = 50-98 mole % and p = 0.5-50 mole %;

and when said photoactive groups are exposed to light of determined wavelengths above 305 nm, radicals are generated and retained on the macromolecular photocrosslinkers and reacting so as to accomplish a crosslinked network structure.

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Technik*

15 2. Photocrosslinkers according to claim 1 characterized in that said photoactive group comprises a phosphine oxide.

20 3. Photocrosslinkers according to claim 2 characterized in that the photoactive group is an acyl- or aroyl phosphine oxide.

25 4. Photocrosslinkers according to claim 3 characterized in that the photoactive group is linked to the ethylene groups of units C by a linking group comprising a phenylene group, said phenylene group being optionally substituted.

30 5. Photocrosslinkers according to claim 1, wherein the ethylene units A, B, C of the macromolecular structure comprises substituents in accordance with:

A = -CH₂-C(R¹R²)-, B = -CH₂-C(R¹R³)-, C = -CH₂-C(R¹R⁴)-, wherein

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R¹ is hydrogen or methyl;

R² is -CON(Me)₂, -CO₂CH₂CH₂OH, -OCOCH₃, -OCOCH₂CH₂Ph, -OH or a lactam group;

R³ is -CON(Me)₂, -CO₂CH₂CH₂OH, -OCOCH₃, -OCOCH₂CH₂Ph, -OH or a lactam group when B is -CH₂-C(R¹R³)- with the proviso that R² and R³ are not the same unless R² and R³ is -OH; and

→ R⁴ is -R⁵C(O)P(O)R⁶R⁷ or -R⁵P(O)R⁶OC(O)R⁷, wherein R⁵, R⁶ and R⁷ are selected among same or different aryl groups comprising phenyl, methylphenyl, dimethylphenyl, trimethylphenyl, methoxyphenyl, dimethoxyphenyl, trimethoxyphenyl, methyolphenyl, dimethyolphenyl, trimethyolphenyl or styryl radicals.

6. Photocrosslinkers according to claim 5, wherein R² and R³ are selected so as to form a water-soluble molecule.

7. Photocrosslinkers according to claim 5, wherein said lactam units together with units A or B constitute N-vinylpyrrolidone units.

8. Photocrosslinkers according to claim 5, wherein at least one of R² and R³ is hydroxyl.

9. Photocrosslinkers according to claim 5, wherein A is N-vinylpyrrolidone, B is vinyl alcohol.

10. Photocrosslinkers according to claim 1 ~~or 5~~ provided with functional groups for crosslinking.

11. Photocrosslinkers according to claim 10 provided with functional groups selected among vinylic, acrylic and methacrylic groups.

12. Photocrosslinkers according to claim 1 characterized in that units A, B and C are

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siloxane monomer units of a general formula -R_aR_bSiO-, wherein R_a and R_b in units A and B are selected among lower substituted or unsubstituted alkyl groups, aryl groups and arylalkyl groups.

13. Photocrosslinkers according to claim 12, wherein at least one of R_a and R_b is an aryl or arylalkyl group.

14. Photocrosslinkers according to claim 13, wherein at least one of R_a and R_b is substituted with one or more fluorine atoms.

15. Photocrosslinkers according to claim 1, wherein units A, B, C are siloxane units comprising substituents in accordance with:

A is -Si(R¹R²)-O-, B is -Si(R¹R³)-O- and C is -Si(R¹R⁴)-O-, wherein

R¹ is C1 to C6 alkyl; R² is C1 to C6 alkyl or phenyl; R³ is R¹, R² or C1 to C6 fluoroalkyl;

→ R⁴ is -R⁵R⁶C(O)P(O)R⁷R⁸ or -R⁵R⁶P(O)R⁷OC(O)R⁸, wherein R⁵ is a spacing group; R⁶, R⁷ and R⁸ are selected among same or different aryl groups comprising phenyl, methylphenyl, dimethylphenyl, trimethylphenyl, methoxyphenyl, dimethoxyphenyl, trimethoxyphenyl, methylolphenyl, dimethylolphenyl, trimethylolphenyl or styryl radicals.

16. Photocrosslinkers according to claim 15, wherein R⁵ is aliphatic spacing group comprising between one and ten atoms.

17. Photocrosslinker according to claim 16, wherein said spacing group is (-CH₂)_n, wherein n is between 1 and 10.

18. Photocrosslinkers according to claim 15, wherein R¹ is methyl; R² is methyl or phenyl; R³ is R¹, R² or -CH₂CH₂CF₃.

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19. Photocrosslinkers according to claim 15 having functional acrylic groups in its terminal ends.

Amend 02
20. A method of forming a macromolecular crosslinked network from a composition comprising a photocrosslinker according to any of claims 1 to ~~19~~ by irradiating said composition with light exceeding a wavelength of about 305 nm for a time sufficient to form a solid article.

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21. A method forming a macromolecular crosslinked network from a composition comprising a photocrosslinker according to any of claims 1 to ~~1~~ and at least one copolymerizable vinylic, acrylic or methacrylic monomer.

22. A method according to claim 20, wherein said composition further comprises a polymer provided with functional vinylic, acrylic or methacrylic groups.

23. A method according to claim 22, wherein said polymer has a backbone of ethylene units.

24. A method according to claim 22, wherein said polymer is a polysiloxane. *1712*

Amend 03
25. A method according to any of claims 20 to ~~24~~, wherein an ophthalmic lens is produced.

26. A method according to claim 25, wherein an intraocular lens is produced in the capsular bag of the eye. *112 no ante 128?*

Amend 04
27. An ophthalmically acceptable composition comprising photocrosslinkers according to any of claims 1 to ~~19~~, having a refractive index greater than about 1.39 and a viscosity such that said composition can be injected through standard cannula having a needle of 15 Gauge, or finer.

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28. The use of *see and* photocrosslinkers according to any of claims 1 to 19 in an ophthalmologically acceptable composition for injection into the capsular bag of the eye. *1*

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